NON-PUBLIC?: N
ACCESSION #: 9310210115
LICENSEE EVENT REPORT (LER)

FACILITY NAME: CRYSTAL RIVER UNIT 3 (CR-3) PAGE: 1 OF 04

DOCKET NUMBER: 05000302

TITLE: Reactor Coolant Pump Trip Causes Plant Transient and
Reactor Trip
EVENT DATE: 09/18/93 LER #: 93-009-00 REPORT DATE: 10/13/93

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: E. E. Froats, TELEPHONE: (904) 795-6486
Manager Nuclear Compliance

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: RC COMPONENT: CAP MANUFACTURER: W120
D MS RV D245
E FW FCV B045
E FW FCV F130
REPORTABLE NPRDS: Y
Y
Y
Y
SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On September 18, 1993, Crystal River Unit 3 was in MODE 1 (POWER OPERATION) at 100% power. At 2348, a high differential current alarm for the "D" Reactor Coolant Pump (RCP) was received in the control room. Almost immediately, the "D" RCP tripped on high differential current. The Integrated Control System responded by beginning an automatic plant runback to 75% power. Approximately eight seconds later, the Reactor Protection System tripped the reactor on flux/flow/imbalance.

One of the Main Steam Safety Valves did not fully reseat following t

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trip. Personnel dispatched to the valve discovered that a non-captive release nut had rotated slightly, preventing the valve from fully seating. The valve was returned to the fully seated position following a re-adjustment and locking of the release nut. FPC determined that the RCP trip was caused by a shorted "B" phase surge capacitor, which was replaced. Several other minor plant anomalies were experienced coincident with the reactor trip and were subsequently corrected.

FPC is considering additional evaluations and corrective actions.

END OF ABSTRACT

EVENT DESCRIPTION:

On September 18, 1993, at 2348, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE 1 (POWER OPERATION) at 100% power producing 864 megawatts. Maintenance personnel were monitoring and troubleshooting a small feedwater oscillation. No other maintenance or testing was in progress.

At 2348, the control room operators received a high differential current alarm on the Main Control Board (MCB)MCBD! for the "D" Reactor Coolant Pump (RCP)AB,P!. Almost immediately, the "D" RCP trip annunciator alarm flashed as the RCP tripped on high differential current. The Integrated Control System (ICS)JA! responded immediately by beginning an automatic plant runback to 75% power. Approximately eight seconds later, the total RCS flow low came into alarm and three of the four Reactor Protection System (RPS)JC! channel flux/flow/imbalance bistables tripped the reactor AC! as designed. The operators performed the immediate actions of their Emergency Operating Procedure for a reactor trip. FPC determined that the RCP trip was caused by a shorted "B" phase surge capacitor AB,CAP!, which was replaced.

The operators observed that one of the Main Steam Safety Valves (MSV-42)SB,RV! did not fully reseat. The operating procedure directed the operators to reduce steam header pressure from 1010 pounds per square inch (psi) to 800 psi in order to facilitate the reseating of MSV-42. The Reactor Coolant System (RCS)AB! pressure correspondingly decreased to 1810 psi and the pressurizer PZR! level reached its low level limit. The operators responded by opening one High Pressure Injection (HPI) nozzle valve BQ,V!. The Senior Reactor Operator (SRO) concluded that MSV-42 would not reseat and instructed the operators to return header pressure to the normal post trip value, which resulted in the pressurizer

level increasing above the low level limit. Maintenance personnel dispatched to MSV-42 discovered that a non-captive release nut had rotated slightly, preventing the valve from fully seating. MSV-42 was returned to the fully seated position following a readjustment and locking of the release nut.

Several minor plant anomalies were experienced coincident with the reactor trip. A feedwater control valve (FWV-38)SJ,FCV! appeared to fail to full open when an ICS signal instructed the valve to fully close. An investigation showed that valve position indication devices were responsible for the erroneous readings. Another feedwater control valve (FWV-40)SJ,FCV! was found with its air regulator RG,FCV! adjusted below its established setpoint, causing an air failure condition which locks the valve in place until it is reset by the operator. Following several attempts to reset the valve, an adjustment of the air regulator was completed and the valve functioned normally. Various unit 480 volt AC loads tripped during an apparently slow post-trip bus transfer from the auxiliary transformer XFMR! to the startup transformer XFMR!. No major loads were lost and all redundant equipment and loads with automatic restart capability functioned normally.

At 2138 on September 20, 1993, CR-3 was returned to MODE 1 following replacement of the "D" RCP "B" phase surge suppressor, calibration check of the RPS, and correction of other minor plant anomalies.

The event was reported to the Nuclear Regulatory Commission at 0035 on September 19, 1993 via the Emergency Notification System per the requirements of 10CFR50.72(b)(2)(ii). This report is submitted in accordance with the requirements of 10CFR50.73(a)(2)(iv).

EVENT ANALYSIS:

The failure of a RCP is within the conditions analyzed by the Final Safety Analysis Report (FSAR). The RPS properly responded to place the plant into a safe shutdown condition. The RPS requires two of four channels to trip to produce a reactor trip. In this event, three of the four RPS channels tripped. The fourth channel had the lowest reactor power level signal. It is believed that the reactor tripped before the fourth RPS channel tripped and the falling power level prevented the flux/flow/imbalance trip of the fourth channel. There was no threat to the health and safety of the public at any time during this event.

CAUSE:

The initiating event was the high differential current on the "D" RCP resulting in a RCP trip. The high differential current was the result of a shorted "B" phase surge capacitor. During plant runback, reactor coolant flow decreased faster than reactor power resulting in a nuclear power/flow reactor trip caused by channel trips of three of four RPS channel flux/flow/imbalance bistables.

MSV-42 was prevented from fully seating by a castellated release nut that had escaped the locking function of a cotter key and had rotated downward slightly during valve actuation.

CORRECTIVE ACTIONS:

FPC personnel replaced the surge capacitor and will perform a root cause analysis of the surge capacitor failure and may develop additional corrective actions based on the root cause. The full seating of main steam safety valves, including MSV-42, will be assured by appropriate procedure changes and possible replacement of the release nuts with ones having multiple castellations. An evaluation of the CR-3 auxiliary transformer bus/equipment alignment is being conducted to assess the adequacy of the current design. The FPC training simulator response will be benchmarked against available plant response data. Performance anomalies will be

documented and corrected in accordance with approved training department procedures.

FPC will consider additional corrective actions based on the results of evaluations as they are completed.

PREVIOUS SIMILAR EVENTS:

There have been five similar events at CR-3 in which a RCP tripped due to electrical or mechanical failure.

Florida
Power
CORPORATION

Crystal River Unit 3
Docket No. 50-302

October 13, 1993

3F1093-10

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Licensee Event Report (LER) 93-09

Dear Sir:

Enclosed is Licensee Event Report (LER) 93-09 which is submitted in accordance with 10 CFR 50.73.

Sincerely,

G. L. Boldt
Vice President
Nuclear Production

EEF:mag

Enclosure

xc: Regional Administrator, Region II
Project Manager, NRR
Senior Resident Inspector

A Florida Progress Company

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